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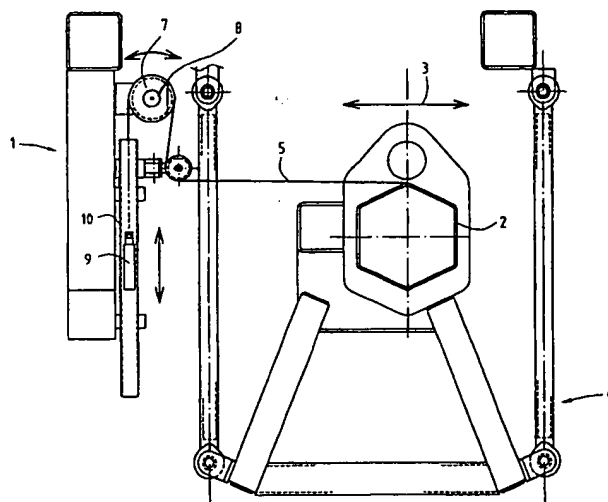
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(54) Title: REFUSE-PROCESSING UNIT HAVING A LOCATION DETECTING DEVICE



(57) Abstract

Refuse-processing unit, having a location detecting device for detecting the location of a linearly displaceable part (2) of the refuse-processing unit, comprising: a flexible tension means (5) which is connected at one end to the displaceable part (2) of the refuse-processing unit; a guide wheel (7) which is rotatably connected to the frame (1) of the refuse-processing unit and over which the flexible tension means (5) is guided in such a manner that a movement of the flexible tension means (5) triggers a rotation of the guide wheel (7); a prestressing means which is connected to the other end of the flexible tension means (5); and a rotation sensor (8) for detecting a certain rotation of the guide wheel (7).

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Short title: Refuse-processing unit having a location detecting device

The invention relates to a refuse-processing unit having a location detecting device for detecting the location of a linearly displaceable element or movable part of the unit. A refuse-processing unit may, for example, be a
5 mobile refuse-collection device, such as a dustcart, but may also be a stationary refuse-collection or refuse-processing device, such as a stationary refuse press.

Known systems for detecting the location of a linearly displaceable element of a refuse-processing unit are,
10 for example, proximity switches. If, during a displacement, the element approaches a proximity switch of this nature, the latter will transmit a signal, so that the location of the element at that moment is known. Although proximity switches are inexpensive, they have the drawback that they
15 are only able to detect one location of the element per switch, namely that location at which they are disposed. It is also possible to find on the market location switches which are able to detect a plurality of locations of an element, for example a slide resistor which is connected to
20 the displaceable element, the difference in potential measured being linked to the location of the element. However, current location switches are expensive and susceptible to faults.

The object of the present invention is to provide a
25 refuse-processing unit having a location detecting device in which the drawbacks mentioned above are eliminated.

According to the invention, this object is achieved by means of a refuse-processing unit having a location detecting device according to claim 1. A location detecting
30 device of this nature makes it possible to detect the linear displacement of a moveable element of the refuse-processing unit with a very high level of accuracy. Any displacement of the element is followed by the prestressed, flexible tension means. The displacement of the flexible

tension means is transmitted to the guide wheel and is detected via a rotation sensor which is connected thereto. The location detecting device according to the invention is simple to produce, inexpensive and provides very reliable results.

In order for the refuse-processing unit to function correctly, it is of critical importance that the location of various movable parts be known at all times. This is important for correct operation of the refuse-processing unit, the various moving parts often having an effect on one another or being dependent on one another. Also, high safety standards are imposed on refuse-processing units, and consequently all kinds of movements have to be monitored continuously. One example is the location of a movable loading arm for lifting refuse containers. Surprisingly, it has been found that the location detecting device according to the invention provides particularly accurate and reliable results when used on refuse-processing units.

Preferred embodiments of the invention are defined in claims 2-4.

The invention will be explained in more detail with reference to the appended drawing, in which:

Fig. 1 shows a diagrammatic top view of a dustcart;

Fig. 2 shows a location detecting device according to the invention which is used on a loading arm of a dustcart; and

Fig. 3 shows a location detecting device according to the invention which is used on a press ram of a modular press unit.

Fig. 1 shows a dustcart 100 with a cab 101 and a loading container 102. A compression plate 103 can be moved back and forth in the loading container 102 with the aid of hydraulic cylinders 104, in order to compact refuse which has been tipped into the loading container 102. At the side, the dustcart 100 is equipped with an extendable loading arm 110 which is provided at its end with a lift comb 111. The lift comb 111 serves to engage on a refuse container 112. In order to be able to pick up the refuse container 112 after the dustcart 110 has moved alongside it,

the loading arm 110 is able to slide inwards and outwards in a direction perpendicular to the longitudinal axis of the dustcart 110, and also to move laterally in a direction which is parallel to the longitudinal axis of the dustcart
5 100.

Fig. 2 shows a cross-sectional view, in more detail, of the loading arm of Fig. 1. In this figure, the loading arm is denoted by the reference numeral 2. As stated above and indicated by arrow 3, the loading arm 2
10 can be displaced in the lateral direction with respect to a chassis 1 of the dustcart. The displacement is carried out with the aid of actuating means which are not shown. To this end, the loading arm 2 is suspended in a pivotable parallel arm structure 4. A location detecting device
15 according to the invention is used in order to be able to establish the lateral location of the loading arm 2 at any time. The location detecting device according to the invention substantially comprises a flexible tension means 5 which is connected at one end to the loading arm 2. The
20 flexible tension means 5 is guided over a guide wheel 7 and then extends vertically downwards. The other end of the flexible tension means 5 is connected to a tensioning weight 9. The tensioning weight 9 is able to move vertically up and down in a protective sleeve 10. The protective
25 sleeve 10 is fixedly connected to the chassis 1. As an alternative to a tensioning weight, it is also possible to use a tension spring. It is then no longer necessary for the flexible tension means, after it has been guided over the guide wheel, to be guided downwards in the vertical
30 direction. Owing to the fact that the flexible tension means 5 is held under continuous stress, a linear displacement of the loading arm 2, to the left or to the right in the figure, will be followed by the flexible tension means 5. The displacement or movement of the flexible tension
35 means 5 results in a rotation of the guide wheel 7. A rotation sensor 8 is connected to the guide wheel 7. A rotation of the guide wheel 7 is detected by the rotation sensor 8.

The rotation sensor 8 is preferably formed by a commercially available potentiometer. Naturally, various

other means which are able to detect the rotation of the guide wheel 8 can also be used. For example, it is also possible to use an angle-location encoder wheel.

The flexible tension means 5 is advantageously formed by a cord. This cord may, for example, be wrapped twice around the guide wheel, so that the guide wheel will follow any displacement of the cord. As an alternative to a cord, the flexible tension means used may also be a strip, chain or belt.

As an alternative to the loading arm described above, the location detecting device according to the invention can also be used to detect locations and/or locational changes of various other movable parts of a dustcart. The location and/or the locational change of a linearly displaceable element can be detected using very simple means, namely substantially only a flexible tension means, a guide wheel, a prestressing means and a rotation sensor. The location detecting device according to the invention is inexpensive, reliable and advantageously may also be arranged very easily on existing dustcarts.

Fig. 3 shows a modular press unit 30 with a refuse-collection chamber 31 and a press ram 32 which is able to move back and forth therein. In use, the refuse-collection chamber 31 is filled from above with refuse, after which the press ram 32 compacts the refuse and pushes it in front of it towards a refuse container 33 to which the press unit 30 connects. At the location of the connection to the press unit 30, the refuse container 33 is provided with a hydraulically actuable door 35. In the open position of the door 35, the press ram 32 is able to push a quantity of compacted refuse into the inside of the refuse container 33.

A location detecting device 40 according to the invention is used in order to be able to establish the location of the press ram 32 in the refuse-collection chamber 31 at any time. The location detecting device 40 substantially corresponds to that shown in Fig. 2 and will not be explained further here. In this case, a flexible tension means 41 of the location detecting device 40 is connected at one end to the press ram 32.

The continuous monitoring of the location of the press ram 32 is of critical importance for a number of reasons. One of these reasons is the interaction with the hydraulically actuatable door 35. When the refuse container 5 33 is full, the door 35 is to be closed. During closure, the door 35 firstly comes to rest against the press ram 32. Then, the press ram 32 is retracted sufficiently far for the door 35 to be able to move just past the front of the press ram 32. If the press ram 32 were not to be retracted 10 sufficiently far, for whatever reason, this would lead to very considerable damage to the hydraulically actuated door 35. An indication of the fact that the refuse container 33 is full is when the press ram 32 does not reach the end of its travel during a compacting stroke. The location detecting 15 ing device can also be advantageously used in this context.

The modular press unit 30 may, for example, be employed in a mobile refuse-collection device, but also in a stationary refuse press.

Although only one type of dustcart and modular 20 press unit are shown, the invention also relates to other types of mobile refuse-collection devices and also to stationary refuse-collection devices. All these refuse-processing units work in very arduous and dirty environments. Using the structurally simple location detecting device 25 according to the invention in these rough environments for processing refuse has surprisingly been found to give very reliable results. This advantageously makes it possible to further automate and protect refuse-processing units.

CLAIMS

1. Refuse-processing unit, having a location detecting device for detecting the location of a linearly displaceable part (2) of the refuse-processing unit, comprising:
 - 5 - a flexible tension means (5) which is connected at one end to the displaceable part (2) of the refuse-processing unit;
 - a guide wheel (7) which is rotatably connected to the frame (1) of the refuse-processing unit and over which the
 - 10 flexible tension means (5) is guided in such a manner that a movement of the flexible tension means (5) triggers a rotation of the guide wheel (7);
 - a prestressing means which is connected to the other end of the flexible tension means (5); and
 - 15 - a rotation sensor (8) for detecting a certain rotation of the guide wheel (7).
2. Refuse-processing unit according to claim 1, in which the rotation sensor (8) is a potentiometer.
3. Refuse-processing unit according to claim 1 or 2,
- 20 in which the flexible tension means (5) is a cord.
4. Refuse-processing unit according to one of the preceding claims, in which the prestressing means is a tensioning weight (9).

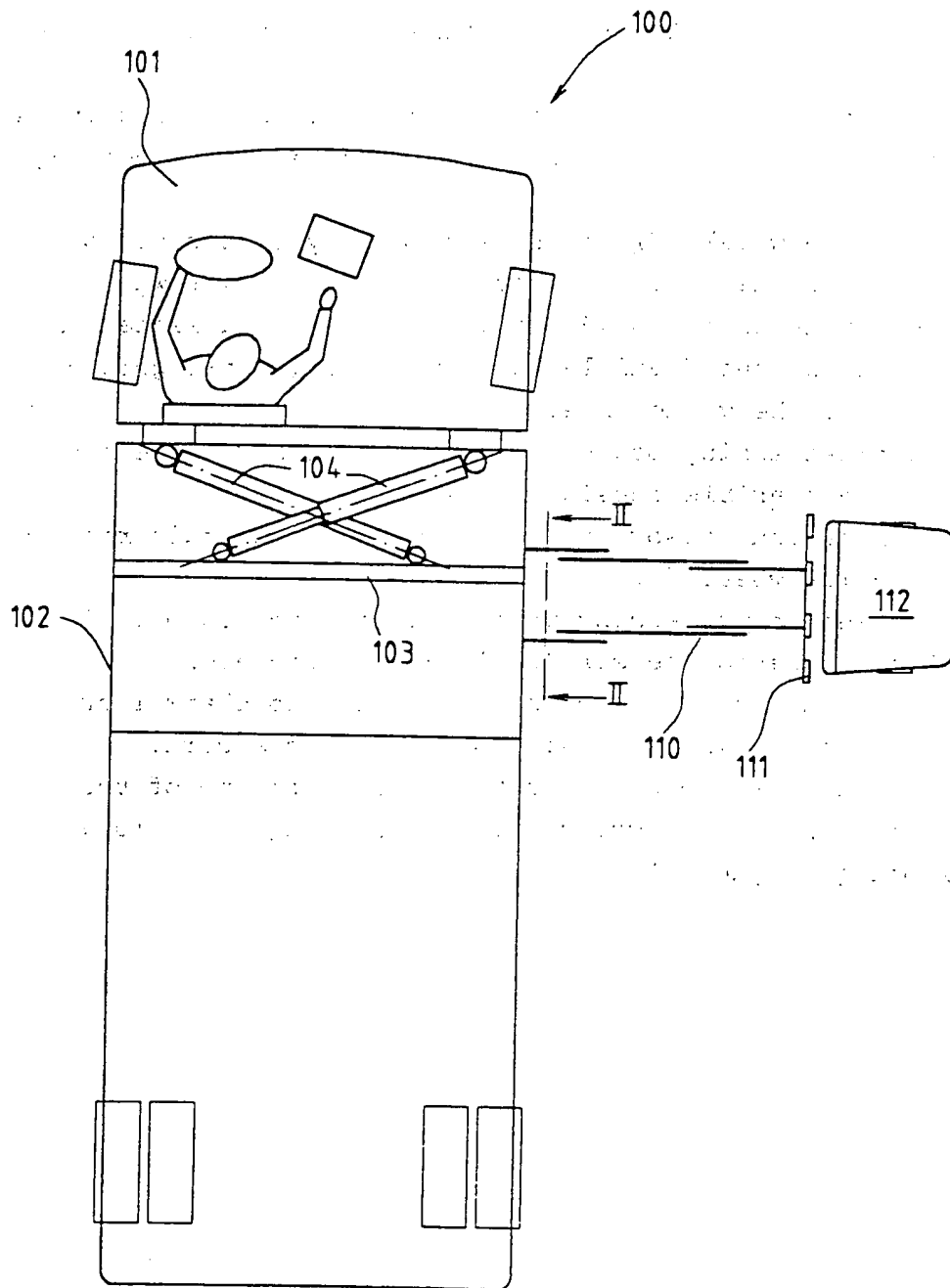
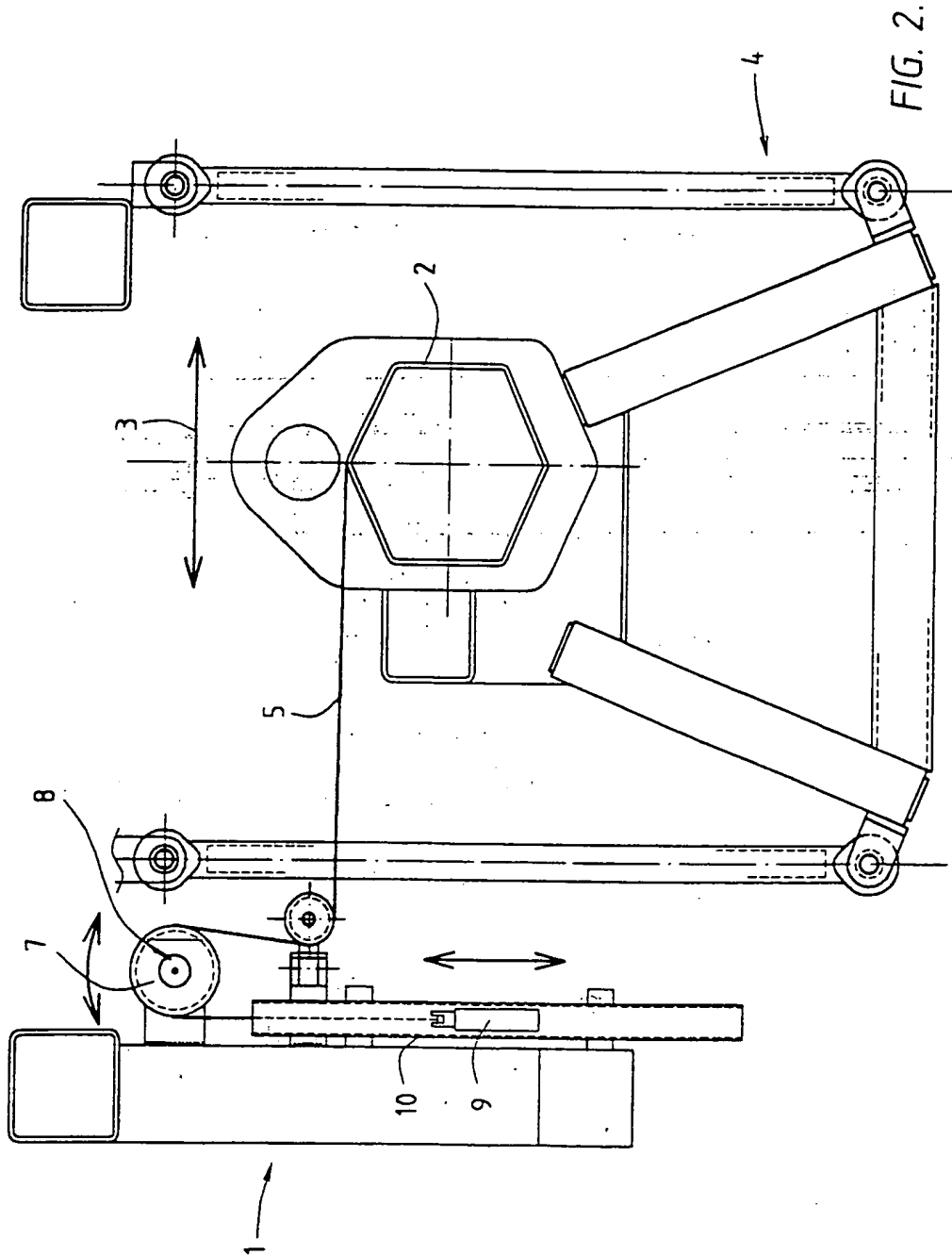
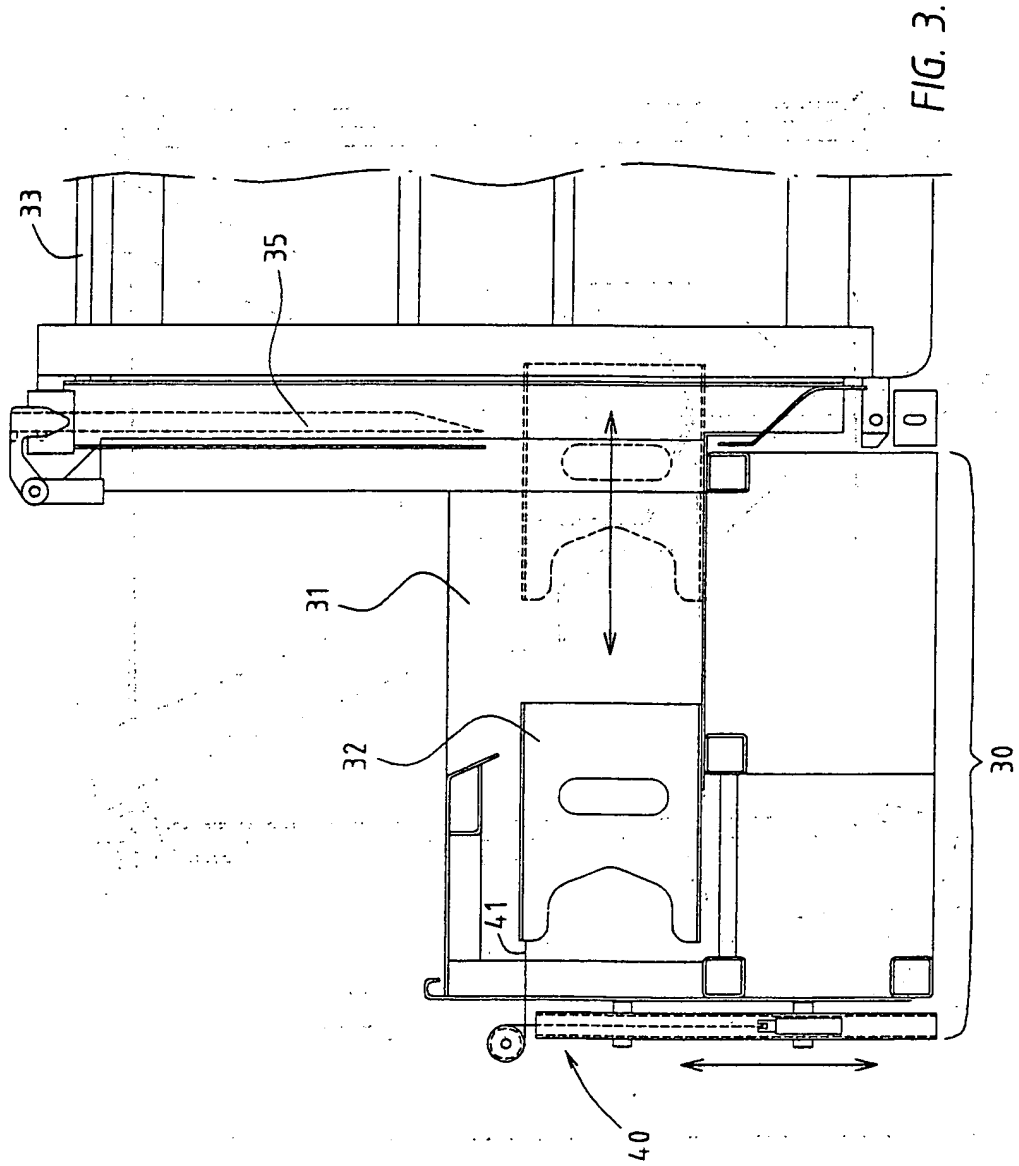


FIG. 1.





INTERNATIONAL SEARCH REPORT

International Application No
PCT/NL 98/00696

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 B65F3/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 B65F G01D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 38 28 845 A (FRITZ SCHÄFER GMBH) 1 March 1990 see column 3, line 48 - column 4, line 8 see figures 1,2 ----	1
A	US 5 007 786 A (J. BINGMAN) 16 April 1991 see column 29, line 68 - column 30, line 33; figures 10,15,16,20 ----	1
A	DE 29 42 513 A (BERGWERKSVERBAND GMBH) 14 May 1981 see page 5, line 17 - page 7, line 5; figures 1,2 ----	1-3
A	US 4 899 602 A (N. FENDER) 13 February 1990 see column 2, line 61 - column 4, line 65 see figures 1-3 -----	1

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DE 3828845	A	01-03-1990	NONE	
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DE 2942513	A	14-05-1981	NONE	
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